GB1460465

Publication Title:

ROLLER TEST STNADS FOR MOTOR VEHICLES

Abstract:

Abstract of GB1460465

1460465 Roller test stand ROBERT BOSCH GmbH 5 Feb 1974 [6 Feb 1973] 5202/74 Heading G1N A roller test stand for motor vehicles comprises; an electrical machine 4 e.g. an eddy current brake, for driving or braking at least one roller 3 of the stand; a control circuit for controlling the roller speed by way of the machine, the circuit having a potentiometer 9 and lever 10 for determining the desired value for the speed and a correction element in the form of a potentiometer 17 of which the tapping 16 is adjusted by lever 5 as a function of the reaction torque arising during operation of the machine. The correction is necessary because the controller 8 has proportional-plus-differential action so a permanent control deviation will occur. To correct this a lower desired speed value has to be simulated by the correction element. Thus if an undesired increase in roller speed occurs due to increase in brake horsepower from the vehicle wheel 1 the tapping 16 is adjusted by lever 5 due to torque reaction of the machine. As a result a corrective voltage of inverse polarity to that from 9, 10 is supplied to the inverting input of the amplifier 19. So a lower desired speed value is simulated and the actual speed is controlled back to the true desired value. The torque reaction pro- duced when machine 4 brakes the roller acts on a pressure cell 6 via the lever 5 which cell is connec- ted to an indicator 7.

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(54) IMPROVEMENTS IN ROLLER TEST STANDS FOR MOTOR VEHICLES

(71) We, ROBERT BOSCH GMBH, a German Company, of Postfach 50, 7 Stuttgart 1, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The invention relates to a roller test stand for motor vehicles.

A known such test stand comprises an electrical machine connected to at least one roller of the test stand for braking the roller; and a control circuit for controlling the speed of the vehicle wheel rolling upon the rollers, the circuit having a device for determining the desired value of the roller speed.

For determining the power of motor vehicles, the procedure is often that the speed of the vehicle wheels, i.e. the speed of the rollers upon which the vehicle wheels are rolling, is controlled at a certain position of the accelerator pedal. For this purpose at least one roller of the test stand is braked by an electrical machine which is mounted so that it can be pivoted. On braking of the roller a torque reaction arises which can be measured with the help of a pressure cell. The magnitude of the particular torque reaction is indicative of the power of the motor vehicle. The speed control circuit required for the purpose includes a manual switch by means of which the desired value for the speed is pre-selected. Since with increasing pull of the wheels on the rollers the electrical machine has to apply a greater braking power to these rollers, it is necessary to supply the electrical machine with a greater control voltage. However, as the brake receives its control voltage from a controller with proportional action, a permanent control deviation will occur which will increase with increasing pull. Consequently errors in the measuring result may arise.

The present invention provides a roller test stand for motor vehicles, comprising at least one electrical machine for driving or braking at least one roller of the test stand; and a control circuit for controlling the speed of said at least one roller by way of the or each electrical machine, the circuit comprising a device for determining a desired value for the roller speed and a correction element operable to provide a signal dependent upon the reaction torque applied to said at least one machine by said at least one roller and to adjust said desired value in dependence upon the value of said signal.

The invention is further described hereinafter, by way of example, with reference to the accompanying drawing which shows a roller test stand according to the invention including a control circuit for controlling the speed of a vehicle wheel, i.e. of the corresponding roller of the test stand.

In the drawing is shown a vehicle wheel 1 which rolls on rollers 2 and 3 of a roller test stand not shown in detail. The roller 3 is connected to an electrical machine 4 which can be used for driving or braking the roller 3. The electrical machine 4 is pivotally mounted so that the torque reaction produced when the machine 4 brakes the roller 3 acts on a pressure cell 6 via a lever 5, the pressure cell 6 being connected to an indicator instrument 7. The magnitude of the torque reaction which arises on braking of the roller 3 represents a measure of the power applied to the vehicle wheel 1 and consequently to the roller 3. As the power measurement is to take place at a definite speed or at several definite speeds, a control circuit is provided for the control of the speed of the electrical machine and hence of the roller 3. In this control circuit there is in-

cluded a controller 8 with proportional-plus-differential action. The controller is connected, as shown by the broken line, to receive as an actual value an electric signal representative of the speed of the roller 3. A desired value is determined by means of a device which includes a potentiometer 9, a tapping of which is adjusted by means of a lever 10 to command a desired speed. The potentiometer is connected between a negative supply voltage $-U_B$ and earth. The tapping of the potentiometer 9 is connected to the inverting input of an operational amplifier 19, whose output is connected to the controller 8. The output signal of the operational amplifier 19 forms the desired value for the speed control.

A resistor 12 is connected between the non-inverting input of the operational amplifier 19 and earth. A feedback resistor 13 is also connected between the output and the inverting input of the operational amplifier 19 and a resistor 14 also connects the inverting input to a correction element which comprises a potentiometer 17 whose tapping 16 is mechanically connected to the lever 5. This correction element adjusts the desired value formed with the help of the adjusting device 9, 10 and of the operational amplifier 19 as a function of the pull on the roller 3, i.e. as a function of the torque reaction of the electrical machine 4. This is necessary because in a control circuit which includes a controller with proportional action a permanent control deviation will occur. Since the desired value, uncorrected by the correction element, is kept constant by the adjusting device 9,10, the permanent control deviation increases with increasing braking power, ie. the actual value representing the speed of the roller will rise somewhat. In order to correct this, a somewhat lower desired value has to be simulated with the help of the correction element. This is carried out by adjusting the tapping 16 of the potentiometer 17 by means of the lever 5, which is mechanically connected to the electrical machine 4. The potentiometer 17 is connected between a positive operating voltage $+U_B$ and earth. The tapping 16 of the potentiometer 17 is connected to the resistor 14, and via this resistor 14 to the inverting input of the operational amplifier 19.

If in the event of an increase in the braking power an increase of the actual value representing the speed of the roller occurs, the tapping 16 is adjusted owing to the larger torque reaction which is transmitted via the lever 5 from the electrical machine 4 to the pressure cell 6. As a result, a corrective voltage of inverse polarity to the voltage supplied by the device 9, 10 is applied to the inverting input of the operational amplifier 19. Consequently a somewhat lower desired speed value is simulated, so that the actual speed, altered owing to the increase in braking power, is controlled back to the original value, since a corresponding signal is transmitted from the proportional-plus-differential action controller to the electrical machine 4. The electrical machine may be, for example, a generator with appropriate load or an eddy-current brake.

WHAT WE CLAIM IS:

1. A roller test stand for motor vehicles comprising at least one electrical machine for driving or braking at least one roller of the test stand; and a control circuit for controlling the speed of said at least one roller by way of the or each electrical machine, the circuit comprising a device for determining a desired value for the roller speed and a correction element operable to provide a signal dependent upon the reaction torque applied to said at least one machine by said at least one roller and to adjust said desired value in dependence upon the value of said signal.

2. A roller test stand as claimed in claim 1, wherein the control circuit further comprises an operational amplifier, to one input of which both the device and the correction element are connected.

3. A roller test stand as claimed in claim 2, in which the correction element includes a potentiometer, a tapping of which is connected to the machine so as to be adjustable as a function of the reaction torque arising during braking operation of the electrical machine.

4. A roller test stand as claimed in claim 2 or 3 in which the device and the correction element are connected to said one input of the operational amplifier by way of respective resistors.

5. A roller test stand as claimed in claim 2, 3 or 4 in which the output of the operational amplifier is connected to a controller which is in operative connection with the electrical machine.

6. A roller test stand as claimed in claim 5 in which the controller has a proportional-plus-differential action.

7. A roller test stand constructed and arranged and adapted to operate substantially as hereinbefore described with reference to the accompanying drawing.

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1460465 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*